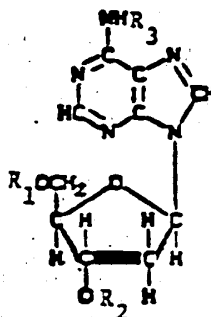


administering to said animal an effective amount of an acyl derivative of 2'-deoxyadenosine, having the formula

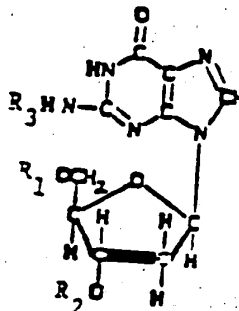


wherein  $R_1$ ,  $R_2$ , and  $R_3$  are the same or different and each is hydrogen or an acyl group derived from

- (a) an unbranched fatty acid with 3 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid having 3 to 22 carbon atoms, provided that not all of  $R_1$ ,  $R_2$ , and  $R_3$  are H, and where  $R_3$  is not H, then  $R_1$  and/or  $R_2$  may also be acetyl, or a pharmaceutically acceptable salt thereof.

49. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of

administering to said animal an effective amount of an acyl derivative of 2'-deoxyguanosine having the formula

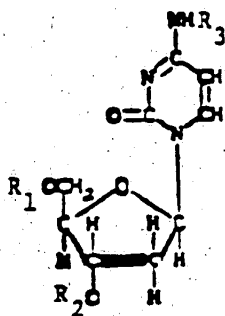


wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are the same or different and each is hydrogen or an acyl group derived from

- (a) an unbranched fatty acid with 3 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, phenylalanine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid having 3 to 22 carbon atoms, provided that not all of R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are H, and where R<sub>3</sub> is not H, then R<sub>1</sub> and/or R<sub>2</sub> may also be acetyl, or a pharmaceutically acceptable salt thereof.

50. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of

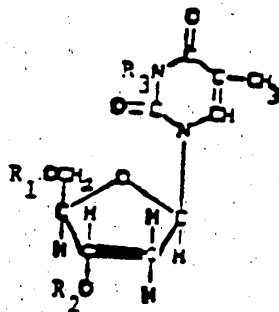
administering to said animal an effective amount of an acyl derivative of 2'-deoxycytidine, having the formula



wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are the same or different and each is hydrogen or an acyl group derived from

- B  
contd*
- (a) an unbranched fatty acid with 3 to 22 carbon atoms,
  - (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
  - (c) nicotinic acid, or
  - (d) a dicarboxylic acid having 3 to 22 carbon atoms, provided that not all of R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are H, and where R<sub>3</sub> is not H, then R<sub>1</sub> and/or R<sub>2</sub> may also be acetyl, or a pharmaceutically acceptable salt thereof.

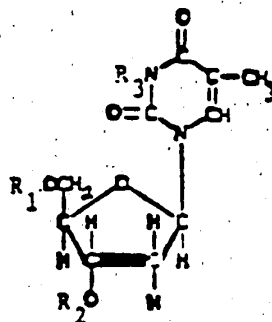
51. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of administering to said animal an effective amount of an acyl derivative of 2'-deoxythymidine, having the formula



wherein R<sub>1</sub> is an acyl group derived from

- (a) an unbranched fatty acid with 3 to 15 or 17 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid having 3 to 22 carbon atoms, and R<sub>2</sub> and R<sub>3</sub> are H, or a pharmaceutically acceptable salt thereof.

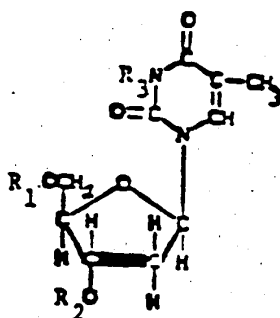
52. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of administering to said animal an effective amount of an acyl derivative of 2'-deoxythymidine, having the formula



wherein R<sub>1</sub> is H, R<sub>2</sub> is an acyl group derived from

- (a) an unbranched fatty acid with 3 to 13 or 15 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid with 3 to 22 carbon atoms, and R<sub>3</sub> is H or a pharmaceutically acceptable salt thereof.

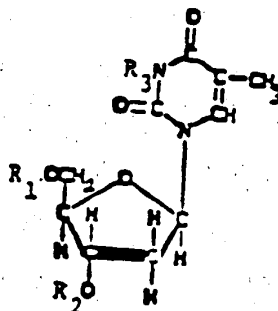
53. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of administering to said animal an effective amount of an acyl derivative of 2'-deoxythymidine, having the formula



wherein R<sub>1</sub> and R<sub>2</sub> are the same or different and each is an acyl group derived from

- (a) an unbranched fatty acid with 5 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid with 3 to 22 carbon atoms, and R<sub>3</sub> is H or a pharmaceutically acceptable salt thereof.

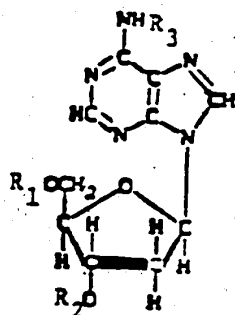
54. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of administering to said animal an effective amount of an acyl derivative of 2'-deoxythymidine, having the formula



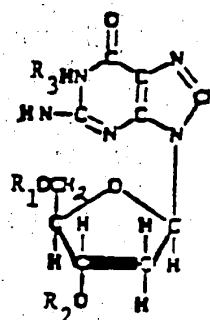
wherein R<sub>1</sub> and R<sub>2</sub> are the same or different and each is an acyl group derived from

- (a) an unbranched fatty acid with 2 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid or
- (d) a dicarboxylic acid with 3 to 22 carbon atoms, and R<sub>3</sub> is an acyl group derived from an optionally substituted benzoyl or heterocyclic carboxylic acid that is substantially nontoxic, or a pharmaceutically acceptable salt thereof.

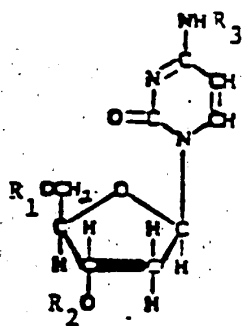
55. (New) A method of enhancing the delivery of exogenous deoxyribonucleosides to the tissue of an animal, comprising the step of administering to said animal an effective amount of each of at least two compounds selected from at least two of the groups of compounds having formulae



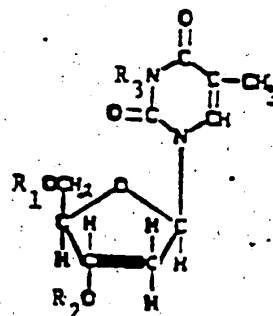
(I)



(II)



(III)



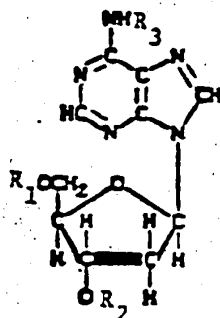
(IV)

wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are the same or different and each is H or an acyl group derived from a carboxylic acid, provided that at least one of said



substituents  $R_1$ ,  $R_2$ , and  $R_3$  on each of said groups of compounds is not hydrogen, or pharmaceutically acceptable salts thereof.

56. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an animal an effective amount of a composition comprising an acyl derivative of 2'-deoxyadenosine, having the formula



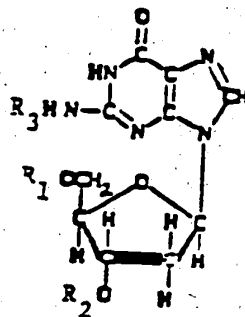
wherein  $R_1$ ,  $R_2$ , and  $R_3$  are the same or different and each is hydrogen or an acyl group derived from

- (a) an unbranched fatty acid with 3 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline,

serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,

- (c) nicotinic acid, or
- (d) a dicarboxylic acid having 3 to 22 carbon atoms, provided that not all of  $R_1$ ,  $R_2$ , and  $R_3$  are H, and where  $R_3$  is not H, then  $R_1$  and/or  $R_2$  may also be acetyl, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

57. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an animal an effective amount of a composition comprising an acyl derivative of 2'-deoxyguanosine having the formula



wherein  $R_1$ ,  $R_2$ , and  $R_3$  are the same or different and each is hydrogen or an acyl group derived from

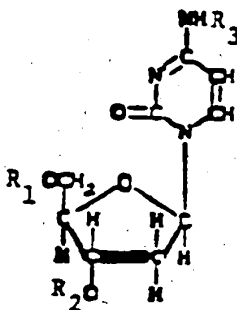
- (a) an unbranched fatty acid with 3 to 22 carbon atoms,

(b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, phenylalanine, carnitine, and ornithine,

(c) nicotinic acid, or

(d) a dicarboxylic acid having 3 to 22 carbon atoms, provided that not all of  $R_1$ ,  $R_2$ , and  $R_3$  are H, and where  $R_3$  is not H, then  $R_1$  and/or  $R_2$  may also be acetyl, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

58. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an animal an effective amount of a composition comprising an acyl derivative of 2'-deoxycytidine, having the formula

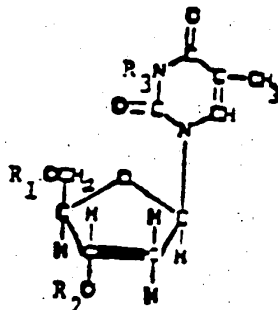


wherein  $R_1$ ,  $R_2$ , and  $R_3$  are the same or different and each is hydrogen or an acyl group derived from

- (a) an unbranched fatty acid with 3 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid having 3 to 22 carbon atoms, provided that not all of  $R_1$ ,  $R_2$ , and  $R_3$  are H, and where  $R_3$  is not H, then  $R_1$  and/or  $R_2$  may also be acetyl, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

B  
contd

59. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an animal an effective amount of a composition comprising an acyl derivative of 2'-deoxythymidine, having the formula

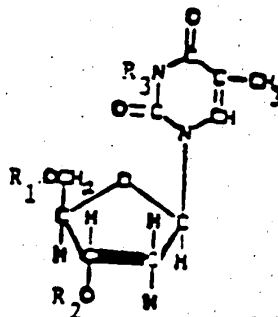


wherein R<sub>1</sub> is an acyl group derived from

- (a) an unbranched fatty acid with 3 to 15 or 17 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid having 3 to 22 carbon atoms, and R<sub>2</sub> and R<sub>3</sub> are H, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

60. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an

animal an effective amount of a composition comprising an acyl derivative of 2'-deoxythymidine, having the formula

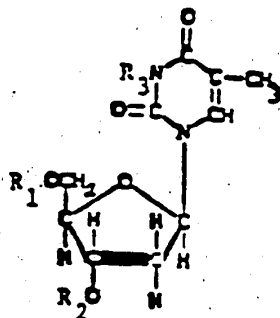


wherein R<sub>1</sub> is H, R<sub>2</sub> is an acyl group derived from

- (a) an unbranched fatty acid with 3 to 13 or 15 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid with 3 to 22 carbon atoms, and R<sub>3</sub> is H or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

61. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an

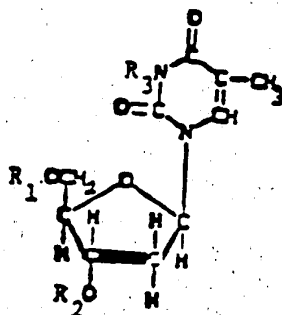
animal an effective amount of a composition comprising an acyl derivative of 2'-deoxythymidine, having the formula



wherein R<sub>1</sub> and R<sub>2</sub> are the same or different and each is an acyl group derived from

- (a) an unbranched fatty acid with 5 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid, or
- (d) a dicarboxylic acid with 3 to 22 carbon atoms, and R<sub>3</sub> is H or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

62. (New) A method for treating or preventing radiation-induced cellular damage or sunlight-induced cellular damage comprising administering to an animal an effective amount of a composition comprising an acyl derivative of 2'-deoxythymidine, having the formula



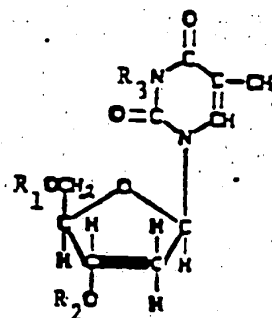
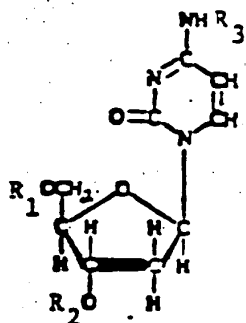
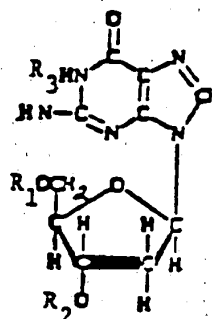
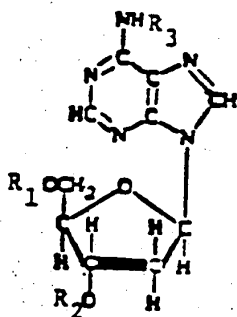
wherein R<sub>1</sub> and R<sub>2</sub> are the same or different and each is an acyl group derived from

- (a) an unbranched fatty acid with 2 to 22 carbon atoms,
- (b) an amino acid selected from the group consisting of glycine, the L forms of alanine, valine, leucine, isoleucine, tyrosine, proline, hydroxyproline, serine, threonine, cysteine, aspartic acid, glutamic acid, arginine, lysine, histidine, carnitine, and ornithine,
- (c) nicotinic acid or
- (d) a dicarboxylic acid with 3 to 22 carbon atoms, and R<sub>3</sub> is an acyl group derived from an optionally substituted benzoyl or heterocyclic carboxylic



acid that is substantially nontoxic, or a pharmaceutically acceptable salt thereof,  
and a pharmaceutically acceptable carrier.

63. (New) A method for treating or preventing radiation-induced cellular  
damage or sunlight-induced cellular damage comprising administering to an  
animal an effective amount of a composition comprising an effective amount of  
each of at least two compounds selected from at least two of the groups of  
compounds having formulae



wherein  $R_1$ ,  $R_2$ , and  $R_3$  are the same or different and each is H or an acyl group derived from a carboxylic acid, provided that at least one of said substituents  $R_1$ ,  $R_2$ , and  $R_3$  on each of said groups of compounds is not hydrogen, or pharmaceutically acceptable salts thereof, and a pharmaceutically acceptable carrier.

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